

SOLAR SCREEN ARTICLES AND METHODS THEREOF

Field of the Invention

5 This invention relates generally to articles incorporating thermal insulation materials, and more specifically, to solar screen articles and methods thereof.

Background of the Invention

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In the past, solar screen materials have been used as thermal insulation materials in solar screen applications. For example, essentially rectangular shaped frames with screen material inserted into them were used for shading and as insect and dust barriers. Thermal solar screens were generally installed on the outside of windows or any other suitable opening in a building, such as a patio.

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Current thermal solar screens are a great benefit to buildings because they greatly reduce the amount of heat and glare when installed on the outside of windows, thereby improving energy conservation. Thermal solar screens also provide more privacy inside a building, while allowing full visibility through windows. Thermal solar screens do not inhibit natural ventilation and are effective insulating barriers year round.

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Solar screen materials typically comprise woven fiberglass available in various weave patterns and tightness of weave. The weave pattern and tightness of the weave account for the degree to which solar screen materials are able to act as insulators. Solar screen materials are also available in a variety of colors.

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Typically, solar screen materials have not been used for making articles other than those discussed above. Instead, Simon, U.S. Patent 6,497,444 disclosed a typical shielding material for a golf cart application using a woven vinyl-covered fabric made of polyester. Similarly, Randall, U.S. Patent 5,839,462 disclosed a typical shielding material for an extensible and retractable canopy structure for vehicles using a woven vinyl-covered fabric made of polyester. More recently, Teahan, U.S. Patent 6,595,017 and Carter, U.S. Patent 6,158,175 both disclosed a shielding material for shading air conditioning units using a plurality of solar screen materials. However, none of these disclosures have suggested any further applications where solar screen materials may be used.

For the foregoing reasons, there is a need to provide novel articles that make use of solar screen materials and methods thereof.

Summary of the Invention

Accordingly, it is an object of this invention to provide improved articles having thermal insulation properties that use solar screen materials.

It is a still further object of this invention to provide improved articles having substantially one-way visibility that use solar screen materials.

It is a still further object of this invention to provide methods for using solar screen materials for assembling improved articles having thermal insulation and one-way visibility.

Preferred Embodiments of the Invention

In accordance with one embodiment of this invention, a solar screen article comprises, in combination a solar screen material coupled to a frame assembly, the solar screen article selected from the group consisting of an umbrella cover, a swamp cooler cover, a fluid container cover, a shelter cover, a compartment, a pane protector, a convertible top, a sun visor and a hat, the solar screen material providing at least thermal insulation, UV protection and one-way visibility for a user of the solar screen article.

In accordance with a second embodiment of this invention, a method for assembling a solar screen article comprises the steps of providing a solar screen material, the solar screen article selected from the group consisting of an umbrella cover, a swamp cooler cover, a fluid container cover, a shelter cover, a compartment, a pane protector, a convertible top, a sun visor and a hat; and coupling the solar screen material to a frame assembly, the solar screen material achieving at least thermal insulation, UV protection and one-way visibility for a user of the solar screen article.

The foregoing and other objects, features, and advantages of the invention will be apparent from the following, more detailed description of the preferred embodiments of the invention, as illustrated in the accompanying drawings.

Brief Description of the Drawings

Fig. 1 is a perspective view of an umbrella having an umbrella cover comprising a solar screen material and showing
5 an elevation view of a portion of the solar screen material according to this disclosure;

Fig. 2 is a perspective view of a swamp cooler having a swamp cooler cover substantially comprising the solar screen material of Fig. 1, in which the swamp cooler cover is spaced
10 at a distance from the surface of the swamp cooler;

Fig. 3 is a perspective view of a fluid container having a fluid container cover substantially comprising the solar screen material of Fig. 1, in which the fluid container cover is spaced from the surface of the fluid container;

15 Fig. 4 is a perspective view of a shelter cover of a shelter substantially comprising the solar screen material of Fig. 1;

Fig. 5 is a perspective view of a baby stroller showing a compartment for a baby substantially comprising the solar
20 screen material of Fig. 1;

Fig. 6 is a perspective view of a baby trailer towed by a bicycle and showing a compartment for a baby substantially comprising the solar screen material of Fig. 1;

Fig. 7 is a perspective view of a pane protector
25 comprising a combination of a portion of a pane and the solar screen material of Fig. 1;

Fig. 8 is a perspective view of a second example of the pane protector of Fig. 7 comprising a combination of the solar screen material of Fig. 1 located between portions of a pair
30 of panes;

Fig. 9 is a perspective view of a vehicle having a convertible top substantially comprising the solar screen material of Fig. 1;

Fig. 10 is a perspective view of a person wearing a sun visor substantially comprising the solar screen material of Fig. 1;

Fig. 11 is a perspective view of a person wearing a hat comprising the solar screen material of Fig. 1; and

Fig. 12 is a perspective view of a second example of a person wearing a hat comprising the solar screen material of Fig. 1.

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Description of the Invention

In this disclosure, a solar screen material 12 (see Figs. 1-12) refers to a woven fiberglass fabric. An example of the solar screen material 12 is PHIFER SUPER SOLAR SCREENING, manufactured by Phifer Wire Products, Inc., AL, U.S.A. PHIFER SUPER SOLAR SCREENING blocks up to 90% of the sun's heat. It is to be understood that PHIFER SUNTEX® and PHIFER SUNSCREEN® also manufactured by Phifer Wire Products, Inc., AL, U.S.A. may also be used interchangeably with PHIFER SUPER SOLAR SCREENING. PHIFER SUNTEX® blocks up to 80% of the sun's heat, while PHIFER SUNSCREEN® blocks up to 70% of the sun's heat. PHIFER SUNTEX® is more preferred than PHIFER SUNSCREEN® and PHIFER SUPER SOLAR SCREENING is the most preferred solar screen material 12. It is to be understood that the most preferred solar screen material 12 blocks about 90% of the sun's heat and is substantially an insulator.

Referring to Fig. 1, an umbrella cover 10 comprises the solar screen material 12 coupled to a frame assembly 16. The frame assembly 16 is coupled to a handle 14, so that a combination of the umbrella cover 10, the frame assembly 16 and the handle 14 are configured to provide an umbrella. The umbrella is hand held and provides protection from development of skin cancer by blocking UV sunrays. Additionally, the umbrella is beneficial to elderly people who may be adversely affected by the heat of direct sunlight.

Referring to Fig. 2, a swamp cooler cover 20 substantially encloses a swamp cooler 22. The swamp cooler cover 20 comprises the solar screen material 12. A portion of a surface of the swamp cooler cover 20 is separated from a portion of a surface of the swamp cooler 22 by a plurality of spacers 18 so that the surface of the swamp cooler 22 is

insulated from thermal effects resulting in an exterior portion of the swamp cooler 22 remaining cooler compared to the ambient air temperature. The swamp cooler cover 20 may also have drawstrings (not shown in Fig. 2) at the base of the swamp cooler cover 20 so as to fit various sizes of swamp coolers 22. The swamp cooler cover 20 ensures more efficient performance of the swamp cooler 22 and may provide a 40°F temperature difference between the surface of the swamp cooler 22 and the ambient temperature at an outer surface of the swamp cooler cover 20.

Referring to Fig. 3, a fluid container cover 30 substantially encloses a fluid container 24. The fluid container cover 30 comprises the solar screen material 12. A portion of a surface of the fluid container cover 30 is separated from a portion of a surface of the fluid container 24 by a plurality of spacers 18 so that the surface of the fluid container 24 is insulated from thermal effects to keep the contents of the fluid container 24 cooler compared to elevated ambient temperatures. It is understood that the fluid container cover 30 may also have drawstrings (not shown in Fig. 3) so as to fit various sizes of fluid containers 24. A specific kind of fluid container cover is a canteen cover for a canteen. The fluid container cover 30 is of particular value for use by the military, hunters and backpackers. The fluid container cover 30 may have camouflage colorations.

Referring to Fig. 4 a shelter cover 40 for a shelter substantially comprises the solar screen material 12, coupled to a frame assembly (not shown) and the solar screen material 12 and the frame assembly are coupled to a plurality of ropes coupled to a plurality of stakes embedded in a ground support. The shelter cover 40 also has a plurality of openings configured for a plurality of windows and at least a door of

the shelter. The shelter cover 40 protects any occupants in the shelter from extremes of weather because of the insulating properties of the super solar material 12. For example, in hot weather, the occupants of the shelter will remain cooler, whilst in cooler weather the occupants of the shelter will remain warmer. The shelter cover 40 may have camouflage colorations, making the shelter particularly suitable for military use. Outdoorsman and scout organizations may also make use of the properties of the shelter cover 40. Occupants of the shelter are able to look out of the shelter without being observed by others outside of the shelter. It is understood that suitable colors for military applications of the shelter cover 40 include desert sand and green, although other suitable colors providing additional camouflage may be used. A particularly useful variety of shelter is a tent using the solar screen material 12.

Referring to Fig. 5, a baby stroller 50 comprises a compartment 26 for confining a baby in the compartment 26. The baby stroller 50 further comprises a frame assembly (not shown) coupled to the compartment 26 having a plurality of wheels 28 and a handle assembly 32 for pushing the baby stroller 50. The compartment substantially comprises the solar screen material 12 and a plurality of window panes 34. The plurality of window panes 34 permit an adult to observe the baby in the compartment 26 of the baby stroller 50. The plurality of window panes 34 may be made of any suitable material that is at least translucent. Examples of suitable materials for the plurality of window panes 34 include loosely woven plastics such as polyester and nylon, as well as natural fibers such as cotton and wool. The compartment 26 made from the solar screen material 12 provides UV protection, thermal

protection and privacy for the baby as described above in other applications of the solar screen material 12.

Referring to Fig. 6, a baby trailer 60 comprises a compartment 26 for confining a baby in the compartment 26. A frame assembly 36 having at least a pair of wheels 28 supports the compartment 26 (only one of the wheels 28 is shown in Fig. 6). The frame assembly 36 is selectively coupled to a portion of a bicycle 38 (only a portion of the bicycle 36 is shown in Fig. 6) configured so that the portion of the bicycle 38 tows the baby trailer 60. The compartment substantially comprises the solar screen material 12 and a plurality of window panes 34. The plurality of window panes 34 permit an adult to observe the baby in the compartment 26 of the baby trailer 60. The remaining description of the compartment 26 of the baby trailer 60 is similar to the description for the baby stroller 50 above. It is understood that any slow moving vehicle may replace the bicycle 36 for towing the baby trailer 60. An example of a slow moving vehicle is a scooter.

Referring to Fig. 7, a portion of a pane protector 70 comprises a portion of a pane 42 and the solar screen material 12. Typically, the pane 42 is a portion of a sunroof top of a vehicle, such as a car and a truck. The pane 42 is generally located on the outside of the vehicle and the solar screen material 12 is located on the inside of the vehicle. The solar screen material 12 may be coupled directly to the pane 42. Alternatively, the solar screen material 12 may be mounted proximate to the pane 42 using a frame assembly (not shown). The solar screen material 12 provides the benefits discussed above, viz. thermal insulation, UV protection and one-way visibility.

Fig. 8 is a second example of a portion of a pane protector 80 comprising a portion of the solar screen material

12 located between portions of a pair of panes 42. A surface of the solar screen material 12 is coupled to a surface of one of the pair of panes 42 and an opposite surface of the solar screen material 12 is coupled to a surface of another one of the pair of panes 42. In the arrangement of Fig. 8, an outer portion of one of the panes 42 located on the outside of the vehicle and an outer portion of one of the panes 42 located on the inside of the vehicle may be cleaned when necessary. A particularly suitable vehicle using the pane protector 80 is a limousine. It is understood that the pane protector 80 may be used as a replacement of any window in a vehicle.

Additionally, it is to be understood that the pane protector 80 as described above would be suitable for use in other applications such as window glass in housing. It is further understood that the panes 42 may be substantially transparent materials such as glass, plastics, including acrylics and polycarbonates, and combinations of glass and plastics.

Referring to Fig. 9, a convertible top 90 for a vehicle comprises the solar screen material 12 coupled to a frame assembly 44 (partially shown in Fig. 9). It is understood that the convertible top 90 may be shaped differently using different frame assemblies according to the type of vehicle to which the convertible top 90 is coupled. Apart from the advantages described above, the convertible top 90 comprising the solar screen material 12 provides the safety benefit of complete visibility through the solar screen material 12, so that there are no blind spots for a driver. UV protection using the solar screen material 12 also prevents fading and premature cracking where the seating of a vehicle comprises fabrics such as leather and vinyl.

Referring to Fig. 10, a sun visor 100 comprises the solar screen material 12. The sun visor 100 protects a wearer's

eyes from the glare of the sun and acts as a thermal insulator for a wearer's face around the eye area.

Referring to Fig. 11, a hat 110 having a wide brim, comprises the solar screen material 12. Fig. 12 is another
5 example of the hat 110 having a conical shape. In both versions of the hat 110, a wearer is protected from heat exposure in hot weather and is protected from thermal losses in cooler weather because of the insulating property of the solar screen material 12. The hat 110 is particularly useful
10 for strollers, gardeners, field-workers and construction workers who spend many hours outdoors.

Methods for assembling solar screen articles as described above typically use the solar screen material 12 coupled to a frame assembly. Spacers between portions of an article to be
15 covered with the solar screen material may be used to provide improved insulation. The economics of assembling the solar screen articles is not compromised. The benefits of using the solar screen material 12 as described above also add to the economics of assembling the solar screen.

20 In summary, solar screen articles substantially comprising solar screen material provide thermal insulation, UV protection and one-way visibility. Solar screen articles include umbrella covers, swamp cooler covers, fluid container covers, shelters, baby strollers, baby trailers, glass pane
25 protectors, convertible tops, sun visors and hats. Typically the solar screen material is coupled to a frame assembly to assemble the solar screen articles. Spacers between portions of an article to be covered with the solar screen material may be used to provide improved insulation.

30 While the invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood by those skilled in the art that the

foregoing and other changes in form and details may be made therein without departing from the spirit and scope of the invention. For example, the solar screen articles can be altered in various ways within the basic concept of this
5 invention. In particular, it is possible to use more than a single layer of the solar screen material. Where appropriate, the solar screen material may have a larger weave size to provide greater visibility through the solar screen material. Although particular examples of solar screen articles have
10 been described, it is understood that up-sizing some of these articles are encompassed by this disclosure. For example, the canteen cover may also be a water bottle cover for a five-gallon water bottle, or a cover for a NATO can. Similarly, the baby trailer may be up-sized to a full-size trailer for
15 use by adults and to be towed by a vehicle.

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